

Statement of Work
by the AGS RSVP Project Office
for Activities Related to the KOPIO Beam lines and Experiment
October 1, 2004

Introduction

This statement of work (SOW) is made to provide the details of the agreement between the KOPIO Project and the AGS RSVP Project Office at BNL concerning the design efforts on the KOPIO beam lines and experimental area. Generally, this work will consist of conceptual design and development plans for the following subsystems:

AGS Modifications
KOPIO Beam Lines

This SOW covers the period of performance from July 1, 2004 through June 30, 2005.

Personnel & Responsibilities

- P. Pile (BNL) is the head of the AGS RSVP Project Office and the Principal Investigator on the subcontract through which Stony Brook University (SBU) is providing the funds to carry out the work described in this SOW.
- M. Sivertz is the KOPIO AGS Modifications team leader. He is responsible for ensuring that the proposed design of this subsystem meets the physics requirements for KOPIO.
- D. Beavis is the KOPIO Beam Lines team leader. He is responsible for ensuring that the proposed design of this subsystem meets the physics requirements for KOPIO.
- M. Marx (SBU) is the KOPIO Project Manager. He is responsible for ensuring that all of the proposed subsystem designs interface properly with one another and the rest of KOPIO's subsystems.
- C. Pearson is the C-A Liaison Engineer for KOPIO. He is responsible for ensuring that the proposed designs interface properly with C-A subsystems and meet C-A Safety and operational requirements.
- K. Brown is the C-A Physicist for KOPIO AGS Modifications. He is responsible for ensuring that the proposed designs interface properly with C-A subsystems and meet the C-A safety and operational requirements.

Deliverables

AGS Modifications

1. A planning document for the testing and installation of the 25 MHz RF cavity being built at TRIUMF, and layout drawings for the configuration to fit cavity and power supplies in AGS.
2. Produce a prototype cavity (with TRIUMF) and design for a 25 MHz device.
3. A removal procedure and budget estimate for the existing 93 MHz relocation planning.
4. A Technical Note giving the optimized cavity parameters for KOPIO running for the proposed RF cavity extraction technique to optimize microbunch width and extinction between the microbunches, and will provide input to the design review for the cavity.

5. A Study (simulations) of the effects of high intensity beam on the C5 vacuum chamber. A study of the requirements to efficiently inject high intensity beam into the AGS with improved Kicker magnets in the A5 straight section, culminating in a design review of the Kicker Magnets.
6. A design report of the Studies to improve the efficiency of booster injection to reduce beam losses and radiation damage.

KOPIO Beam Lines

1. Document the definition of the parameters and general configuration for KOPIO Neutral Beam. Layout drawings for conceptual design and configuration for KOPIO Neutral Beam.
2. Baseline estimates and supporting documentation. Participation and support of estimate reviews.
3. Document the definition of the Primary Beam design parameters, including beam transport system, instrumentation, magnets, beam pipe, layout and configuration.
4. Document the Shielding design parameters and configuration, and analysis of effects for the primary beam dump, target area, neutral beam, experimental area.

Costs

Project Supported labor costs are listed below:

Task	Labor Hrs	Salary Cost (\$)	Overhead (\$)	Total Cost (\$)
AGS Modifications (C-AD)				\$265,049
CFI Support and Collaboration	1320 hours Engineering	\$88,255	\$34,834	\$123,090
93 MHz relocation planning	108 hours Engineering	\$7,221	\$2,850	\$10,071
Extraction simulations	320 hours Programmer	\$21,395	\$8,445	\$29,840
C5 Vacuum and A5 Kicker upgrades	740 hours Physicist	\$66,030	\$26,062	\$92,092
Booster Injection Simulations	80 hours Physicist	\$7,138	\$2,818	\$9,956

Task	Labor Hrs	Salary Cost (\$)	Overhead (\$)	Total Cost (\$)
KOPIO Beam Line (C-AD)				\$285,928
Beam Line Conceptual Development and Liaison Services	520 hrs. Liaison Physicist	\$99,074	\$39,105	\$138,179
	520 hrs. Liaison Engineer			
	320 hrs. Designer			
Baseline Support	240 hrs. Physicist	\$52,680	\$20,793	\$73,473
	271 hrs. Engineer			
	160 hrs. Designer			
	80 hrs. Technician			
Primary Beam Design	160 hrs. Physicist	\$33,631	\$13,274	\$46,906
	160hrs. Engineer			
	80hrs. Designer			
	80 hrs. Technician			
Shielding Design	160 hrs. Physicist	\$19,626	\$7,746	\$27,372
	80hrs. Engineer			

Project Supported material costs are listed below:

Item	
Travel for 3 BNL Engineers to TRIUMF	To be provided by Stony Brook University

Schedule

Milestones for this period of performance are listed here:

Milestones	Date
AGS Modifications	
Planning document for 25 MHz RF cavity complete	6/30/05
Layout drawings for 25 MHz RF cavity and power supplies in AGS	6/30/05
Prototype cavity complete	6/30/05
Removal procedure and budget estimate for 93 MHz relocation complete	6/30/05
Technical Note for KOPIO extraction complete	6/30/05
Study of beam effects on the C5 vacuum chamber complete	6/30/05
Study of injection with improved Kicker magnets complete	6/30/05
Design review of the Kicker Magnets	6/30/05
Design report of booster injection complete	6/30/05
KOPIO Beam Lines	
Parameters and general configuration for KOPIO Neutral Beam and primary beam line documented by the KOPIO Project	1/1/05
Layout drawings for KOPIO Neutral Beam complete	6/30/05
Baseline estimates and supporting documentation complete	4/25/05
Primary Beam design parameters report complete	6/30/05
Shielding design parameters and configuration report complete	6/30/05

Project Supplied Materials & Information

The KOPIO Project shall make available, via the project web site, KOPIO Reference Design information for the WBS items covered in this SOW.

Approvals

This Statement of Work has been reviewed and agreed upon by the following individuals:

KOPIO Project Manager date
Michael Marx
Stony Brook University

AGS RSVP Project Manager date
P. Pile
Brookhaven National Laboratory

C-A Asst. Chair for Administration date
J. Hauser
Brookhaven National Laboratory

C-A Chariman date
D. Lowenstein
Brookhaven National Laboratory

Concurrence:

William Willis/Jonathan Kotcher date
RSVP Project Director